



The coSMOS campaign: scientific objectives and first results

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The Soil Moisture and Ocean Salinity (SMOS) mission, also referred to as ESA's "Water Mission", has the objectives to advance knowledge of the water cycle, its dynamics and the possible impact of climate change. Near-surface soil moisture will be derived from multi-angular, dual-polarisation L-band brightness temperature data reconstructed from SMOS interferometric observations. The retrieval scheme currently being developed for the SMOS ground segment processor is based on decision tree accounting for the land surface heterogeneity that assigns different radiative transfer models according to the relevant land cover type. These radiative transfer models are constrained by auxiliary information such as soil texture and vegetation characteristics, accounting for the various contributors of the emitted brightness temperature at L-band. In order to validate the retrieval concept a field campaign for validating the operation of SMOS (coSMOS) has been designed.

coSMOS was a one month-long airborne campaign conducted in co-operation with the Australian's National Airborne Field Experiment (NAFE'05) at the Goulburn River Catchment, about 200 km W of Newcastle, Australia (see www.nafe.unimelb.edu.au) in November 2005. The site is being intensively monitored and studied for soil moisture, and was setup specifically for remote sensing validation and assimilation studies (see www.sasmas.unimelb.edu.au). Permanently installed monitoring stations provide meteorological data and soil moisture profiles. Intensive field measurements of near-surface soil moisture and supporting data were taken concurrently with the airborne data measurements. The core coSMOS instrument was the refurbished TUD EMIRAD

polarimetric L-band radiometer, flown aboard an Aero Commander aircraft, and the core NAFE instrument was the Polarimetric L-band Multibeam Radiometer (PLMR) flown aboard a motor glider. The Aero Commander was also equipped with a thermal infrared radiometer.

The paper is intended to outline the specific campaign objectives, the performed airborne and *in-situ* measurement and show first campaign results.